Massachusetts Urban Forestry Program
The Citizen Forester

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This month's lead article first appeared in the fall 2007 edition of ArcNews, ESRI's online newsletter. It demonstrates the efficiencies municipal urban tree management programs (and the often under utilized street tree inventories) can gain when technology allows for the near real time data collection and reporting between municipal departments. While this level of technology is not practical for every community it is increasingly becoming an option to many. If you're thinking of undertaking a tree inventory, recently completed one or have one sitting on a shelf or hard drive collecting dust you might find parts if not all of this article inspirational to your tree management program. To view the original article with photos visit ESRI news archive by clicking on the link www.esri.com/news/arcnews/fall07articles/buffalo-newyork.html

Web-Based GIS Helps "City of Trees" Recover ; *Buffalo, New York, Urban Tree Management Evolves from Surprise Storm*

By: **Art Traver**, Urban Forest Manager for the City of Buffalo, and **Jake Needle**, GIS Manager, Wendel Duchscherer Architects & Engineers

On October 13, 2006, a historic lake-effect snowstorm surprised the city of Buffalo, New York, dumping more than two feet of snow overnight. Two days later, President George W. Bush issued a major disaster declaration for the city and surrounding areas. Federal aid was made available to assist in recovery efforts.

Located on the northeast shore of Lake Erie, Buffalo sees an average of more than 93 inches of snow each year. This particular storm event was unique because it happened in early October; most major snowfall does not occur until late November or early December. As a result of this snowstorm, there was widespread damage to roughly 85 percent of the area's trees. This damage was a result of vertical snow loading on fully canopied trees, causing limbs to structurally fail. The falling branches caused excessive damage to cars, houses, and power lines, leaving nearly 400,000 residents in more than 100,000 homes without power for several days.

Known as the "City of Trees," the city of Buffalo has maintained a complete urban forest inventory since 2001. This inventory includes all city-owned trees that reside in the public rights-of-way between the curb and sidewalk and also all trees in the city parks. There are 68,000 trees and 108,000 locations included in the tree inventory.

After the October storm and the initial clearing of fallen trees and tree branches from the roadways, the city started assessing the condition of the urban forest. Within the first few days after the storm, the city realized that a new system would have to be implemented to assess and inventory all damaged trees throughout the city. The existing tree inventory management system in place at the time of the storm was not capable of supporting the effort needed to assess and update the inventory on such a large scale. Before the October storm, many of the tasks needed to manage the tree inventory were completed using a paper-based system involving the use of paper tickets. Hours of data entry into a central database was necessary after information was recorded on paper forms out in the field. Another consideration for the development of a new system was to improve the city's chances to qualify and receive maximum funding from the Federal Emergency Management Agency (FEMA) for the several-month-long post-storm cleanup effort.

Urban Forest Specialists and GIS Professionals

Wendel Duchscherer Architects & Engineers, with headquarters in Amherst, New York, has been the city's urban forest manager since 2005, responsible for day-to-day maintenance and management of the tree inventory. This includes the issuance and management of annual trimming, planting, and removal contracts; handling citizen complaints regarding street trees; inspecting contractor work; and inspecting and updating information on each individual street tree in the inventory.

The firm's urban forest specialists and GIS professionals collaborated to develop a GIS-based tree management program to answer the urgent and comprehensive needs of the city resulting from the weather disaster. The program was called Urban ForesTREE Management and was developed utilizing a combination of ArcGIS Server and ArcIMS technologies. When the initial development started two weeks after the storm, four separate groups were identified as primary users of the program: contractors, inspectors, city officials, and the urban forest manager. Each group had a customized Web-based GIS site developed to fit the particular needs and requirements of the work that was completed. By having each site use the same central database, work that was completed on one group's site instantly updated the information on the other three sites. This prevented errors caused by lack of information or delaying communication to the decision makers.

The first task after the storm cleanup was to inventory all the damaged trees of the 68,000 existing trees owned by the city. An ArcIMS application was developed by Wendel Duchscherer to run on a Pocket PC that inspectors used in the field to enter data. One of the main considerations when development started was the elimination of paper forms. These forms were re-created as editable Active Server Page (ASP) forms and integrated into the ArcIMS site. This not only helped the field-workers with organization, it also eliminated the need for office personnel to enter the data into the central database. General reference layers (e.g., parcels, aerial photography and roads) were added to the application to help inspectors reference their location when in the field. Through this application, inspectors were able to select a tree on the map and enter updated information directly into the central database. There were up to 10 inspectors in the field at one time after the storm. Another benefit of this system was the real-time display of completed work. Project decision makers and city officials were able to view daily progress and all detailed field information.

Once the damaged trees were assessed, they were added to either trimming or removal contracts. The firm then developed another ArcIMS application to help contractors mobilize their crews and track and locate the trees on each particular contract. Organization of the individual contractor information was critical, as more than 100 field crews were working throughout the city at any one time. The ArcIMS site provided the contractors with a map and list of the trees for each of their individual contracts. When work on a tree was completed, the contractor was able to request inspection of the tree through the Web site; the inspection request would be instantly added to the Web application, allowing inspectors already mobilized in the field to visit and inspect completed work sites on a timelier basis. This not only automated the scheduling and work assignments for the inspectors but also expedited the verification and payment process for the contractors.

The most complex parts of managing the city of Buffalo's urban forest is editing tree locations and attributes, along with handling complaints submitted by the public. Wendel Duchscherer developed an ArcGIS Web Mapping Application (WMA) designed to efficiently meet these challenges. The urban forest manager needs the ability to edit the location and associated attributes of every tree in the inventory. A tree information tool allows viewing and editing of each tree simply by selecting the tree through the mapping interface. Individual trees can also be added to selected contracts while in the field, eliminating the need to create the contract information at a later time. The city's Web site has a citizen Call and Resolution Center where residents can submit complaints related to city services. Any complaints about city trees are entered into the system by geocoding the address entered on the Web complaint form. These geocoded locations are populated on the WMA site through a nightly automation process. A custom tool was developed that allows the urban forest

manager to select an individual complaint and enter the various attributes recorded for response to the complaint.

The October storm caused unprecedented damage to the city of Buffalo's tree population and, at the same time, changed the management of its urban forest. The GIS-based Urban ForesTREE Management program now provides the city with an innovative system to manage and maintain its urban forest more effectively and efficiently than ever—and saves the city money, which is being reallocated to repopulate the trees that were lost as a result of the storm.

More Information
For more information, contact Art Traver, urban forest manager for the City of Buffalo (e-mail: atraver@wd-ae.com), or Jake Needle, GIS manager, Wendel Duchscherer (e-mail: jneedle@wd-ae.com, tel.: 716-688-0766).

Picks and Shovels

For more related information

Building a Server-Based GIS Public Works Information System
www.geographymatters.com/library/reprints/pdfs/publicworks_building-server-based.pdf
i-Tree Relying on the most recent U.S. Forest Service research and development, i-Tree brings together a host of complimentary urban forestry utilities www.itreetools.org/applications.shtm

Growing Greener

Town of Bernardston, Tree Warden Brad Bordewieck accepted the town's first Tree City USA (TCU) award on May 1st at DCR's TCU ceremony in Wellesley. With only a few years as tree warden under his belt Brad has used the application process to rally the community around the important roll trees play in their lives. The following link shows pictures and descriptions of this year's Arbor Day Celebration that Brad along with Principle Scott Lyman and a few helpers hosted at the Bernardston Elementary School. Following the Arbor Day celebration 100 Red Maple trees and 100 River Birch trees from the Massachusetts Tree Wardens and Foresters Association seedling program were distributed to the children,. "It was a very successful event, and I would like to thank everyone who helped" - Brad Bordewieck Tree Warden.
http://bernardston.pioneervalley.k12.ma.us/ArborDay.htm

Growing on Trees

Placing Historic Value on Trees view this inspirational short video on the history of an ancient live oak along the MS Gulf Coast that survived the hurricanes
http://videos.sunherald.com/vmix_hosted_apps/p/media?id=1841883

UMass Extension's LANDSCAPE MESSAGE intended for Green Industry professional The LANDSCAPE MESSAGE helps landscape, nursery and urban forestry
professionals identify pests in the landscape, monitor their development, plan management strategies and create site-specific records for future management. Each LANDSCAPE MESSAGE includes valuable information from sites throughout Massachusetts: growing degree day accumulation, soil temperature, precipitation amounts, and plant phenology. Detailed reports on the status of insects, diseases, and weeds of interest to landscape and turf managers are also featured in each edition. View the latest edition
http://umassgreeninfo.org/landscape_message/lm_welcome.html or contact Ellen Weeks UMass Extension Landscape/Nursery/Urban Forestry Program

Environmental Justice Grant The Environmental Protection Agency's Office of Environmental Justice (OEJ) established the Environmental Justice Small Grants Program (EJSG) in fiscal year 1994. The purpose of this grant program is to support and empower communities that are working on local solutions to local environmental and/or public health issues. The EJSG Program is designed to assist recipients in building collaborative partnerships that will help them understand and address the environmental and/or public health issues in their communities. Successful collaborative partnerships with other stakeholders involve well-designed strategic plans to build, maintain and sustain the partnerships, and to work towards addressing the local environmental and/or public health issues. Funding Opportunity Number: EPA-OECA-OEJ-08-01 for more information, visit the EPA Environmental Justice Small Grants Program.
http://www.epa.gov/compliance/environmentaljustice/grants/ej-smgrants.html

On The Horizon

Tree Sales and Giveaways May 15 Noon Central / 1:00 p.m. Eastern
ACT Webcast - http://actrees.org/site/stories/act_webcast_series.php
Presented by: Greg Levine, Program Director, Trees Atlanta (Atlanta, GA)
Patrick Hayes, Executive Director, The Park People (Denver, CO)

Stewardship Mapping and Assessment Project (STEW-MAP) Wednesday, May 21st at 11:00 AM (Eastern), Using social-spatial-network analysis to understand urban environmental stewardship in New York City and beyond. For more information and Log-In details, please visit www.unri.org/webcasts

New England Wild Flower Society's Nasami Farm's Open House, free weekly lecture/demonstrations at Nasami Farm, the Society's native plant nursery, 128 North Street, Whately, Massachusetts 413-397-9922.
www.newenglandWILD.org
Edible Native Plants May 11, mixing native perennials with your garden's vegetables and fruits looks and tastes great! Learn more from Nasami's Robin Silva
Consult a Garden Designer May 18, here's your chance for a fifteen minute consultation
Groundcovers Go Native May 25, meet Director Ron Wik and discover a tremendous selection of fascinating native choices for your property

Scouting for Pests and Problems of Woody Ornamentals Walkabout
May 28, 2008: 5-7 pm Bridgewater State College, E. Bridgewater
Insects and Weeds only - Learn how to put IPM practices to work efficiently. Join UMass Extension Specialists Bob Childs and Randy Prostak for a walk through the landscape for demonstrations of IPM tools and techniques, as well as a close look at some of the most common pest and cultural problems of woody ornamentals. Pre-registration required as space is limited; the cost is $50. For more information or a registration form, go to www.umassgreeninfo.org or contact the UMass Extension Landscape, Nursery and Urban Forestry Program at (413) 545-0895 or eweeks@umext.umass.edu.

Heritage Landscape Inventory Workshops The Department of Conservation and Recreation is cosponsoring four free, public workshops this spring to help towns and cities learn how to protect significant landscape features and preserve their community's character for generations to come. To attend a workshop, participants should RSVP at least two days in advance by contacting Joanna Doherty of the Blackstone Heritage Corridor (joanna_doherty@nps.gov or 401-762-0250) or Bob Levite of the Quinebaug-Shetucket Heritage Corridor (boblevite@hotmail.com or 508-831-1223, ext. 244). Below are details on each upcoming workshop.

Local Measures to Protect Historic Resources: Wednesday May 14, 2008, 6:30-8:30 p.m, Sutton Town Hall 4 Uxbridge Road Sutton MA.A discussion of several particularly effective, locally initiated tools to protect historic buildings, landscapes, and neighborhoods including Local Historic Districts and Demolition Delay bylaws. Presented by; Christopher Skelly, director of local government programs for the Massachusetts Historical Commission.

The Community Preservation Act: Strategies for Success Thursday May 29, 6:30-8:30 p.m. Oxford Community Center 4 Maple Road Oxford. Discuss the benefits of the Community Preservation Act, a powerful tool for historic preservation, open space protection, affordable housing, and recreational opportunities, and strategies for a successful CPA campaign. Presented by; Kathy Roth, associate director of the Community Preservation Coalition.

Smart Growth and Preservation the "smart growth" approach to development focuses on sustainability, in part through zoning mechanisms that encourage concentrated development and support existing settlement patterns. Learn about two smart-growth tools: Smart Growth Zoning and Village Center Zoning. Presented by; Eric Hove, acting director of land use policy for the state Executive Office of Energy and Environmental Affairs, and Bill Reyelt, smart growth program coordinator for the state Department of Housing and Community Development.

What About Open Space? Balancing Development and Preservation discusses two tools that can help communities balance growth with preservation: open space residential design and transfer of development rights. Presented by; Eric Hove, acting director of land use policy for the state Executive Office of Energy and Environmental Affairs, Douglas Municipal Center 29 Depot Street Douglas Thursday June 12, 2008 6:30-8:30 p.m.

2008 National Conference on Urban Ecosystems Nature and the Network: Building a new framework for people and nature to work together May 28 - 30, 2008
Caribe Royal Hotel Orlando, Florida. Organized by American Forests the Conference will bring together members of the business, government and conservation communities, to solidify and expand partnerships, assess our progress and plan strategies for building communities of the future.
www.americanforests.org/conference

Tree Risk Identification and Management Wednesday June 4, 2008. 9:00 -3:00 pm Barney Carriage House Forest Park Springfield, MA. Sponsored by: The Massachusetts Tree Wardens' and Foresters Association, University of Massachusetts Dept. of Natural Resource Conservation and the USDA Forest Service Northern Research Station for more information and registration materials visit www.masstreewardens.org or call Karen Doherty at 781-894-4759

UMass Conference on Climate Change June 3-5, 2008 at the University of Massachusetts Amherst, The U.S. Fish and Wildlife Service Northeast Region invites you to attend a workshop "Climate Change in the Northeast: Preparing for the Future". At this workshop, resource managers will develop a common understanding of natural and cultural resource issues and explore climate change management approaches in the Northeast and examine the impacts of climate change in the Northeast to two major ecosystems – Coastal/Oceans and Forests. Registration is on-line at www.aux.umass.edu/conferenceservices/registration.php (select the 2008 Northeast Climate Conference).

Species Spotlight

Maackia amurensis
Amur maackia

Hardiness Zone 4
General Description: Native to Manchuria and a member of the legume family this deciduous tree grows 20'-30'tall with an equivalent spread that forms a rounded canopy. The short main trunk often forks 2'-3' from the ground into multiple main stems creating an attractive form. Leaves are alternate, 8" to 12" long and

pinnately compound with 7 to 11 elliptic or ovate leaflets ranging from 1.5” to 3.5”. Color is an attractive dark olive green, hairs on emerging shoots and leaves makes them appear silvery. Small white pea-like flowers in upright clusters 4” to 6” long are not particularly showy but make for a nice show in June and July. Fruit is a flat pod 2” to 3” long that changes from green to brown. Bark is definitely one of its ornamental assets, color is amber or copper with greenish undertones that exfoliates in curls with younger bark appearing shinny as though it were varnished.

Culture: Performs best in full sun with loose well drained soil, is tolerates of a wide range of pH and can be easily transplanted.

Landscape Use’s: Excellent tree for residence or difficult sites, summer flower and winter bark interest

Liabilities: May not flower consistently, no fall color and may be difficult to find in nurseries

Cultivars/Varieties; none

For more information, see www.hort.uconn.edu/plants/m/maaamu/maaamu1.html

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